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<b>(54) Title:</b> LEVER LOCKING DEVICE AND FITTED UNIT  <div data-bbox="535 1113 1153 1659"> </div>		
<b>(57) Abstract</b>  <p>A lever locking device and fitted unit, and in particular a device for locking the gear lever (12) of a vehicle. The device is suitable for vehicle not only for fitting during vehicle assembly, but also as a retro-fit to existing vehicles. Alternatively, the lever (12) may be an operating lever for a machine. The device includes a housing (20), a lock member (25) carried by and movable in the housing (20), a lock (27) mounted to the housing (20) and being engageable inside the housing (20) by the lock member (25), the lock (27) being key-controlled from outside the housing (20), the lock member (25) and lock (27) having a first condition in which the lock member (25) is disengaged from the lock (27), and a second condition in which the lock member (25) is engaged by the lock (27).</p>		

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## LEVER LOCKING DEVICE AND FITTED UNIT

## FIELD OF THE INVENTION

5 This invention relates to a lever locking device and fitted unit, and in particular to a device for locking the gear lever of a vehicle. The device is suitable not only for fitting to a vehicle during vehicle assembly, but also as a retro-fit to existing vehicles. Alternatively, the lever  
10 may be an operating lever for a machine.

## BACKGROUND TO THE INVENTION

Vehicle theft, particularly car theft, is an increasing  
15 problem. As is well known, cars in particular are stolen not only by so-called joy-riders, but also for re-sale, possibly in another country. Insurance companies are proposing to raise their premiums generally, to the disadvantage of careful car owners, and especially when an  
20 anti-theft device is not fitted or not used. Thus there is a widespread need for a cheap but effective vehicle anti-theft device, which also is convenient to access and use whilst the driver is still seated in the car.

## 25 DISCUSSION OF THE PRIOR ART

A number of vehicle anti-theft devices and arrangements have been proposed over the years.

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One general class of device requires the ignition key to be inserted and operated, before the lock, typically a steering lock, can be released. However, the ignition circuit is often easily by-passed, and the device and arrangement is rendered inoperative if an electrical fault occurs.

In a modification, a secondary switch in series with the ignition switch is situated in a concealed position within the vehicle, but this position must be communicated to all authorised drivers of the vehicle, who could otherwise be left stranded; this modification is thus not popular with vehicle owners, and in any event the concealment position is easily ascertained in advance by a determined thief. Furthermore, the secondary switch may perhaps be awkward to reach, yet must be switched to the ignition "disengaged" condition each time the vehicle is parked in order to be of use, and this operation may not always be performed if for example the driver is short of time or has become less

Steering wheel locks are known and widely used, but can often be wrenched free with an appropriate tool, and so rendered inoperative.

Another widely-used device mechanically locks a foot pedal to the vehicle steering wheel, but the coupling is exposed to view and can be severed by the use of a suitable tool.

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The vehicle driver may not be willing to spend the time required to effect securement, especially when it means standing outside the vehicle, possibly in inclement weather.

5 Another known device mechanically couples the gear lever to the handbrake i.e. a bracket embraces the gear lever, and a sleeve covers the handbrake lever, the connection being such that the gear lever has only limited permitted movement; typically, the gear lever will be positioned so that one of  
10 the gears is engaged, and the device is then put in place to prevent that gear being disengaged. However, this device can be overcome by simply removing the gear knob, to permit the bracket to be slid over the end and so released from the gear lever. It has also been known for thieves  
15 alternatively quickly to cut off the top of the gear lever, to release the bracket.

#### STATEMENT OF THE INVENTION

20 We now propose a lever locking device which reduces or avoids some or all of the above problems.

Thus, we propose a lever locking device comprising in combination a housing, a lock member carried by and movable  
25 in the housing, a lock mounted to the housing and being engagable inside the housing by the lock member, the lock being key-controlled from outside the housing, the lock member and lock having a first condition in which the lock

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member is disengaged from the lock, and a second condition in which the lock member is engaged by the lock.

Usefully, manual gripping means project from the housing, 5 the gripping means being holdable to permit the lock member to be moved from its position when in the one said condition towards its position for the other said condition.

Preferably, the grippable member can act to move the lock 10 member from the first or non-locked condition towards the second or locking condition against the action of a spring, the spring thereafter releasing or assisting the release of the lock member when the lock is disabled, as by the key being turned to release the locking engagement. The spring 15 has one end connected to the housing and the other end connected to the lock member. Preferably the lock is automatic, holding the lock member when in (or close to) the second position in the second (locking) condition; but the lock may alternatively require a key to be turned or 20 otherwise operated to effect second condition locking, when the lock member has reached its second position, so that in this embodiment without use of the key, the lock member can simply be withdrawn from its second position.

25 Usefully the lock member is carried by a plate guided to move in the housing. Desirably the movable plate is a slide plate, having limited sliding movement within the housing.

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recess is removed from around the gear lever, in another embodiment from alongside the gear lever.

The housing can form part of the vehicle interior decor, or  
5 being normally at foot level can be concealed by a flexible gaiter or plastics console, leaving access for insertion and removal of the operating key or the like, even when carried on a key ring.

10 In a particular embodiment the lock can engage directly with the lock member to prevent movement thereof relative to the housing. In an alternative embodiment the lock can move a pivoted lever adapted to restrain movement of the lock member; in a preferred embodiment the lock carries an  
15 abutment for the first end of the lock member whilst the lever carries an abutment for the second end of the lock member, each abutment being engageable with the housing when the device is in the locked condition so as to avoid the lock being stressed if an attempt is then made to move the  
20 lock member.

Preferably, indicator means are provided so that the user can be aware that the lock member is suitably positioned either to receive the lock itself or to accommodate the  
25 abutment members i.e. that the device is in the second condition, ready for locking.

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The housing can be open at its base, with its periphery secured to the vehicle floor, or it can have an enclosure plate to provide a closed base and thus enclosed housing, with the enclosure plate being secured to the vehicle floor.

5

In addition, we now propose a method of fitting a device according to the invention to a unit such as a vehicle, the unit having a panel such as a vehicle floor, the panel having an aperture through which an operating lever projects, the method comprising the steps of (a) securing a base plate to the panel adjacent said aperture, and (b) securing the device to the base plate.

In a preferred embodiment, there are provided means to release the base plate from the panel, said means being inaccessible whilst the device is secured thereto, and there is also provided removable securement means for the device to the base plate, said securement means being inaccessible when the lock member is in the said second condition.

20

#### BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be further described, by way of example, with reference to the accompanying drawings, in which:-

25

Fig.1 is a schematic view of a car shown mainly in dotted outline, with an anti-theft device



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according to the invention fitted in the front compartment adjacent the driver position;

Fig.2 is a view of the fascia and controls of a vehicle,  
5 with an anti-theft device according to the invention fitted;

Fig.3 is a view of the centre console of a vehicle with  
an anti-theft device according to the invention  
10 fitted;

Fig.4 is a perspective view of one embodiment of device  
according to the invention in the first condition;

15 Fig.5 is a perspective view of the device of Fig.4 in  
the second condition;

Fig.6 is a perspective view of an alternative embodiment  
of vehicle anti-theft device;

20

Fig.7 is a part-sectional view of an embodiment of anti-  
theft device, in the first condition, viewed from  
the securement side of the housing;

25 Fig.8 is a part-sectional view of another embodiment of  
anti-theft device, in the second condition, also  
viewed from the securement side of the housing;

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- Fig.9 is a perspective view of another alternative embodiment of device according to the invention, in the second condition;
- 5 Fig.10 is a perspective view of the movable plate and sideplates of the embodiment of Fig.9;
- Fig.11 is a part-sectional view of the lock of the embodiment of Fig.9;
- 10 Fig.12 is a perspective view of yet another embodiment of a device according to the invention;
- Fig.13 is a sectional view of yet a further embodiment, showing a pivoted lock plate;
- 15 Fig.14 is a part sectional view of another alternative embodiment of anti-theft device;
- 20 Fig.15 is a plan view of the locking device of Fig.14;
- Fig.16 is of a further alternative embodiment of anti-theft device;
- 25 Fig.17 is of part of the device of Fig.16, in "neutral";
- Fig.18 is as Fig.17, but in "reverse gear";

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Fig.19 is as Fig.17, but locked in "reverse gear";

Fig.20 is of yet a further alternative embodiment, in "neutral";

5

Fig.21 is as Fig.20, but in "reverse gear"; and

Fig.22 is as Fig.20, but locked in reverse gear.

#### 10 DESCRIPTION OF THE PREFERRED EMBODIMENTS

In the drawings, similar parts of the different embodiments are given the same numbers.

15 As shown in Figs.1-3, a typical vehicle 10, in this embodiment a passenger car, includes a gear lever 12, by which the driver may disengage and engage the differing ratio gears in the vehicle gearbox.

20 The vehicle 10 is fitted with an anti-theft device according to the invention. The device includes a casing or housing 20 (Fig.2), which has an opening 22 (Fig.3) through which the vehicle gear lever 12 projects. Thus for the standard gear lever arrangement the housing 20 is fitted to  
25 the vehicle floor, preferably being welded or otherwise irremovably attached to the vehicle floor. Opening 22 is sufficient for normal gear lever operation, being a narrow

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slot for "fore and aft" automatic-drive gear change, or a wider slot for manual gear change.

Thus, the device, if properly fitted to a new vehicle or as  
5 a retro-fit to an existing vehicle, can only be removed with  
all or part of the vehicle floor, since the operative parts  
are carried by the housing 20 and enclosed by the associated  
vehicle floor portion. Thus as better seen in Figs.7 and 8  
the housing is open at its underside (viewed in normal use  
10 position) to allow assembly of the device, the underside  
being closed by the vehicle floor portion upon vehicle  
fitting.

As shown in Fig.4, housing 20 has a first section 24  
15 providing a guide section for the lock members 25 (by way of  
slide or slide plate 30), and a second section 26 providing  
a securement section containing lock 27. Thus the gear lock  
unit of this embodiment has two lock members coupled to a  
gear-stick locator, and is thus two-part, each part having a  
20 defined function i.e. the gear-stick locator to hold the  
gear lever in one operative position i.e. reverse gear, and  
the lock member(s) to hold the locator in fixed position  
relative to the casing or housing when in the second  
condition as herein defined.

25

Housing first section 24 locates slide 30, which is guided  
in slideways 32 and which is the gear-stick locator. Slide  
30 can be pulled rearwardly i.e. from the Fig.4 position to

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the Fig.5 position, by manually-grippable handle 40, against the action of a return spring 34 (Figs.7,8), coupled at its forward end to the housing 20 and at its rear end either to the slide 30 (Fig.7) or to the lock member 25 (Fig.8) which in this embodiment is welded to the slide 30.

Slide plate 30 has a recess 36 facing towards the housing section 26 i.e rearwardly for the embodiment of Figs. 4,5 and the embodiments of Fig.7 and Fig.8.

10

In the Fig.5 position, recess 36 closely embraces gear lever 12, and has been designed for the particular vehicle to retain the gear lever in the "reverse" position. The recess 36 prevents the gear lever from being manipulated, for instance into another gear selection position such as to the "neutral" or to a "first" or higher gear position. Thus, with the slide 30 in the Fig.5 position, and with the gear lever thereby held in "reverse", the vehicle can only be driven away "in reverse".

20

The gear-stick locator or slide plate 30 can be held in fixed position relative to the casing 20 by one or more lock members. In this embodiment a lock 27 is rigidly mounted internally to housing 20. The slide 30 includes lock members 25 which can penetrate lock 27 upon rearward movement of the slide 30 and associated lock members 25 i.e. from the Fig.4 position (where the lock members are in their first unlocked condition) to the Fig.5 position where they

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can be locked (second locked condition). Thus when in the Fig.5 position, if the lock is operated by rotation of key 44, then the part of lock member 25 buried in lock 27 can be grasped and secured in known fashion. The lock member 25 will preferably terminate in a rearward head, and may have a necked portion (Fig.8).

Thus, the embodiment of Figs 4,5 is set to the second locking condition as by the vehicle driver by pulling on 10 handle 40, and turning key 44, both of which operations can be simply and quickly effected whilst the driver is still seated in the vehicle.

In an alternative embodiment, lock 27 acts automatically 15 upon entry therein of part of lock members 25, so that the key 44 is required only to release the lock; thus in this alternative arrangement, the device is set to the second locking condition by pulling on handle 40, without use of a key.

20

In the alternative embodiment of Fig.6, the slide 30 can move between the first and second conditions in a direction transverse to the gear operating direction. This embodiment is likely to be particularly useful for vehicles with 25 automatic gearboxes, where gear selection is solely by a fore and aft gear lever movement. The slide can be pushed to the left as viewed (to the right in an alternative embodiment for left-hand drive cars), in this embodiment to

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be held concealed in housing 20 where it remains whilst the lock (not shown in this view) remains engaged; release of the lock permits an internal spring to return the slide 30 to the position of Fig.6.

5

The slide of the Fig.6 embodiment moves into the linear pathway of gear lever 12a (i.e. it moves perpendicularly to the movement of the gear lever 12a), to hold the gear lever at one end of the slot (preferably with the gear lever in  
10 "Park"), and so does not have a recess, though in an alternative embodiment the slide is more forwardly positioned and has a recess, facing to the left as viewed in Fig.6.

15 An embodiment similar to that of Fig.6 could also be used for a vehicle with a manual gearbox; in that embodiment, the opening 22 would be larger than that shown in Fig.6, to allow the required lateral movement of the gear lever 12, but the transversely operating slide 30 could be used, such  
20 that when in the second or locked condition, it prevents movement of the gear lever from the "reverse" (for example) gear selection position.

It will also be understood from Fig.6 that a separate  
25 grippable member 40 is not required, but rather that the slide 30 projects from the housing 20 when in the first condition; thus the slide 30 provides its own "grippable member 40". In another alternative embodiment of Fig.6, the

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housing is increased in size in the direction of slide movement, so that the slide 30 may be retained within the housing in both the first and second conditions, with a grippable member projecting from the housing by which to effect movement of the slide..

Different known designs of lock can be used, for example the transverse lock arrangement of Fig.7, or the axial lock arrangement of Fig.8. Also, the Figs.4,5 embodiment has a pair of lock members 25, whereas the embodiments of Fig.7 and Fig.8 have only a single lock member. The type of lock, and the number of lock members can be chosen by the manufacturer.

The housing can have a continuous outer flange 60 (Figs.4,5 and Fig.6), or intermittent flanges 62 (Fig. 7 and Fig.8), in each case of a material readily welded to the vehicle floor. Preferably the flange will be integral with the housing 20, but for retro-fit applications and the like may have been pre-secured thereto (also preferably by welding) prior to intended securement to the vehicle flooring.

In the embodiment of Fig.9 the housing 20 is apertured in its upper surface. Movable plate 130 is free to move within this aperture, and is rotatable about a pivot 50 mounted in opposed housing sidewalls 23. Plate 130 includes a recess 136 (Fig.10) so that in the second or locked condition of



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Fig.9, the recess 136 closely embraces gear lever 12, and so prevents the gear lever from being manipulated.

Plate 130 is curved, and in this embodiment is joined at its 5 sides to sideplates 125. Sideplates 125 include apertures 52, by which the sideplates 125, and thus plate 130, are rotatably connected to pivot 50.

Whilst the device is not shown in the first (or unlocked) 10 condition, it will be understood that the plate 130 can rotate about pivot 50 (clockwise in Fig.9) so that the opening in the upper surface of housing 20 is exposed, allowing normal manipulation of gear lever 12.

15 One of the sideplates 125 has an aperture 133 sized to cooperate with a lock plunger 70 (Fig.11), and so this sideplate provides the lock member, in this embodiment as an integral extension of plate 130.

20 In particular, and as shown in Fig.11, lock 27 includes plunger 70. The lock 27 is mounted within lock housing 72, including an aperture through which plunger 70 can pass. Lock housing 72 is mounted to an end wall 23 of housing 20. In the locked condition of Fig.11, plunger 70 projects from 25 lock housing 72 and into aperture 133 in sideplate 125. Spring 74 acts to return the plunger 70 to the housing 72, but is resisted by lock projection 76 engaging recess 80 in lock housing 72. Upon insertion, and rotation, of key 44 in

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lock 27, projection 76 is withdrawn from recess 80, allowing spring 74 to release plunger 70 from aperture 133.

Movable plate 130 includes manually grippable handle 140, by which the plate 130 may be rotated about pivot 50 from the first condition into the second condition and vice versa. In an alternative embodiment, a spring may be employed to move the plate 130 from the second condition to the first condition. In an alternative embodiment handle 140 also provides an abutment to limit pivotable movement of the plate 130.

In order to activate this embodiment of device, the handle 140 must first be used to pivot the plate 130 from the first condition to the second condition, whereupon the lock 27 may be engaged. However, it will be understood that a lock member similar to that of Figs.4,5 or Figs.7,8 may be fitted to the plate 130 or sideplate 125, to engage with a corresponding lock mounted in the housing. Thus, embodiments are possible wherein the lock may automatically act upon entry of the lock member; the key being required only for release of the lock.

In the embodiments of Figs. 4-9 the housing is substantially inaccessible when the device is in the locked condition. Thus, the opening 22 will be largely closed off by plate 30,130, the housing underside will be closed off by the vehicle floor; in the Figs.4,5 embodiment the aperture for

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grippable member 40 is small and will be largely filled by the shaft of the grippable member; and, in the Fig.6 embodiment, the outer edge of slide 30 will lie flush with the housing wall. Thus, a thief is denied access to the device in order to tamper with it, and its damage by a determined thief (with a tool such as a crow-bar for example) is made difficult.

In an alternative to the Fig.9 embodiment, the recess, when the locking device is in the locked condition as shown in this figure, extends across the full exposed width of the plate 130. In this embodiment, lateral (leftwards and rightwards as viewed) movement of the gear lever 12, when the device is in the locked condition, is possible, but fore and aft (into and out of the paper as viewed) movement is prevented. If, as is usual, the gear-lever has to be moved from the reverse gear position both in the fore/aft and lateral directions to engage another gear, then with this embodiment of locking device the vehicle may be locked into reverse gear. However, since in this embodiment the gear lever 12 is free to move laterally within the recess 136, no force can be imparted to the lock 27 by lateral forcing of the lever 12. Should force be applied to the lever 12 in a lateral direction, the force will be resisted by the housing 20, or by the vehicle gearbox, rather than by the lock 27.

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In the embodiment of Fig.12, housing 220 locates lock member 230 in slideways (such as slideways 332 of Fig. 13) located within and to either side of the housing 220.

5 Lock member or slide 230 can be moved by operating lever 12, in this embodiment a gear lever, whenever the gear lever is itself moved in directions A,B which in the fitted condition of the housing 220 in a vehicle are respectively the fore and aft directions. Thus during gear engagement from the  
10 neutral position shown, whether for a manually operated gear mechanism or an automatically operated gear mechanism, the gear lever 12 engages a respective transverse side face of recess 236. The recess or opening 236 extends transversely to the gear engagement direction A or B.

15

The "neutral" position of the locking member 230 can be indicated by indicator means 224 on the housing 220. The locking member 230 is thus in this "neutral" position in Fig. 12.

20

In a first embodiment, with the gear lever in the neutral position, lock 27 has a plunger which can engage in aperture 225 in the slide 230 (when lock member 230 is in the second condition), to hold the locking member and thus the gear  
25 lever 12 against movement in either direction A or Direction B.

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In the embodiment of Fig.13, a modified engagement arrangement between a lock 327 and a lock member 330 is provided, and which in a preferred embodiment as shown relieves in the locked condition the lock from fore and aft forces when an attempt is made to force operating lever 12 towards a gear change condition.

Thus we provide a pivoted lever 362, which in this embodiment is a pivoted plate, mounted upon pivot 364 and which when depressed by the lock 327 towards and into the locked condition can pivot until abutment 366 is located between the second end 356 of lock member 330 and the end wall of housing 320. Lock member 327 itself carries an abutment 368 which in the locked condition fits between the first end 354 of the lock member and the adjacent housing surface. Thus in the locked condition the lock member is sandwiched between abutments 366,368.

In the embodiment shown, the pivot 364 is offset, so that the lever 362 adopts the angled position shown in Fig.13 under its own weight and from which it has to be pivoted by lock 327 into the locked condition, though in an alternative embodiment, the lever can be spring biased to the non-locking condition shown in Fig.13 and from which it has to be pivoted before locking.

In Fig.14, the anti-theft device is of the type shown in Fig.9, with a plate 130 pivotally mounted to opposed

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sidewalls 23 of housing 20. The floor 400 of the vehicle has an aperture 402, through which the gear lever 12 projects.

5 A base plate 404 is secured to the floor 400 by plates 406 carrying upstanding bolts 408. The bolts 408 pass through holes made in the floor 400, and through holes made in the base plate 404. A nut 410 is secured to each bolt 408, so sandwiching the vehicle floor 400 between the plates 406 and  
10 the base plate 404. The bolts 408 may be of a length so that they do not project beyond the surface of the base plate 404, or they may be cut off flush with the upper (as viewed) surface of base plate 404 after fitment of nuts 410.

15 Base plate 404 also carries four upstanding bolts 412. Upon location of the housing 20 of the locking device, the four bolts 412 pass through pre-drilled holes in the lower surface of housing 20. The pre-drilled holes in the housing are each formed in an internal flange 414, adjacent each  
20 corner of the housing and integral therewith.

In an alternative embodiment, a single internal flange can surround the housing 20 at its lower edge, or a pair of flanges can be provided, one on each side of the housing.

25

The upstanding bolts 412 are accessible through the opening 22 of the housing 20 when in the unlocked condition, so that nuts 416 may be fitted thereto, so securing the housing 20

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to the base plate 404, and so to the vehicle floor 400. However, when the device is in the locked condition, the plate 130 will obscure the bolts 412 and nuts 416, and so prevent their unwanted removal.

5

It will be understood that for the bolts 412 to be accessible through the opening 22 when in the unlocked condition, they must be close to the centre of the aperture 402. Since the size and shape of the aperture 402 will vary  
10 from vehicle to vehicle, the use of a base plate 404 to pre-determine the position of the bolts 412, will allow a single housing 20 to be used on a variety of different vehicles, each vehicle perhaps having a differently-shaped base plate 404. In addition, base plate 404 can be made to conform to  
15 any curvature or other shaping of the vehicle floor 400, without requiring alteration of housing 20.

In this embodiment, the housing 20, when fitted, obscures the bolts 408 and nuts 410, thus preventing their removal.  
20 However, in use on vehicles where the aperture 402 is particularly large, the bolts 408 and nuts 410 may lie beyond the area of the housing 20; in this case, in order to prevent removal of the nuts 410, and so of the base plate 404, a outer flange could be welded to the housing 20 to  
25 cover the nuts 410 and so prevent their removal once the housing is in place.

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The use of bolts and nuts, rather than welding, allows the locking device to be removably secured to a vehicle, so that the device once fitted may later be removed without damage to the vehicle. Furthermore, if the device is to be fitted 5 to a vehicle as an aftermarket fitment (i.e. rather than on the vehicle production line), welding of a locking device may require removal of all the interior trim, which would otherwise be damaged by the heat of welding.

10 In the embodiment of Fig. 16, irremovably secured to gear lever 12 is a flange 525, forming the lock member. In this embodiment the flange 525 is a retro-fit to an existing vehicle gear lever, and is secured by clamp C-rings 526 tightly squeezed around and/or brazed or welded to the gear 15 lever, adjacent the vehicle floor to inhibit access by a cutting tool or the like.

Keeper 550 comprises upper and lower jaws, and is angled so that flange 525 can fit thereinto when gear lever 12 is 20 pivoted rearwardly towards the "reverse gear" gate (not shown), the rearward pivot position being seen in Figs 18,19 i.e. after lateral translation (to the right as viewed) of the gear lever 12 from the "neutral" gear lever position of Fig.17.

25

For normal (driving) use, in this embodiment lock 527 is left untouched, so that the gear lever can be operated



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without interference, entering and leaving the keeper 550 without need to operate the lock 527.

In this preferred embodiment, key 544 must be turned to release the lock 527 (from the Fig.19 condition), but key 544 must also be turned to engage lock 527 i.e to cause lock plunger 529 (Fig.22) to enter aperture 530 of the lock member 525.

10 In an alternative "child-proof" but otherwise less preferred embodiment the lock 527 is automatic, retaining lock member 525 upon every entry into keeper 550, with the lock barrel turning in the Fig.7 embodiment through 90°; key 544 is then needed to release the lock 527, to permit withdrawal of  
15 gear lever 12, for instance every time reverse gear is engaged.

In a further alternative embodiment, the jaws of the keeper can be vertical in their position of use, with the lock  
20 member having a downward extension. This embodiment would be suitable for vehicles wherein the selected gear gate was approached by linear (fore-and-aft) gear lever movement.

In the embodiment of Figs.16-19, the lock member 525 and  
25 keeper 550 are both visible to the driver, and thus to a potential thief, with however keeper 550 welded or otherwise firmly fixed to the vehicle floor, as a deterrent; lock 527

- 25 -

is secured to keeper 550. A housing can however be provided.

In the preferred embodiment of Figs.20-22 the lock member 5 and keeper are concealed by and secured in housing 620 which is itself welded or otherwise firmly fixed to the vehicle floor. Lock 627 is secured to housing 620, with the key being inserted in this embodiment substantially horizontally, from the right as viewed.

10

In the Figs.20-22 embodiment, gear lever 12 is surrounded by a hollow tube 600, with at its upper end in use a finger or hand grip 602.

15 As indicated in Fig.20 (neutral) and Fig.21 (reverse), in normal driving the lock member is clear of the keeper for all gear gate conditions, including especially the "reverse gate" condition; finger grip 602 can however be lifted against bias spring 604 to allow lock member 625 to enter  
20 between the jaws 652,654 (during reverse gear engagement), there to be retained by lock 627 until released by the use of a key. In this embodiment lock 627 acts automatically to engage plunger 529, during entry of lock member 525, to the Fig.22 condition; the plunger 529 is chamfered on one side  
25 and held against rotation, whereby the plunger is lifted during lock member entry between the jaws 652,654 to ride on the lock member before falling (under spring bias) into aperture 530.

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In an alternative embodiment, lock plunger 529 can enter an aligned recess (blind bore or aperture) in lower jaw 654, so that attempted gear lever movement is resisted by plunger 5 529 in shear, rather than in cantilever.

To minimise rattle, the tube 600 is a close sliding fit about the lever 12, the tube preferably carrying internally-fixed bushes which can also act to wipe the lever clean upon 10 use. If desired the spring 604 can be covered by a flexible gaiter.

It will be understood that whilst the drawings all show the use of the device on a vehicle, the device can equally well 15 be used to lock an operating lever on a machine, or any lever projecting from a unit, and requiring to be locked.

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## CLAIMS

1. A lever locking device characterised in combination by a housing (20,220,320,620), a lock member (25,125,625) carried by and movable in the housing, a lock (27,327,627) mounted to the housing and being engageable inside the housing by the lock member, the lock being key-controlled (45) from outside the housing, the lock member and lock having a first condition in which the lock member is disengaged from the lock, and a second condition in which the lock member is engaged by the lock.
2. A device according to claim 1 characterised in that the lock is key-operated, in that the lock member is slidably guided in the housing, and in that manual gripping means (40,140) project from the housing, the gripping means being holdable to permit the lock member to be moved from its position when in the one said condition towards its position for the other said condition.
3. A device according to claim 2 characterised by a spring (34) having one end connected to the housing and the other end connected to the lock member, the gripping means (40,140) being connected to move the lock member from the first or non-locked condition towards the second or locking condition against the action of said spring, whereby the spring thereafter

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assists the release of the lock member when the lock is disengaged.

4. A device according to claim 1 characterised by one of a plate (30) guided to move slidably in the housing and a plate (130) mounted to pivot in the housing, the plate being shaped as a gear-stick locator, and with at least one lock member (25,125) associated with the plate, and with the said at least one lock member being engageable with the lock.
5. A device according to claim 4 characterised by a removable abutment (366) locatable between one end of the plate and the housing (320).
6. A method of fitting a device as claimed in any of claims 1-5 to a unit such as a vehicle, the unit having a panel such as a vehicle floor (400), the panel having an aperture (402) through which an operating lever (12) projects, characterised by the steps of (a) securing a base plate (404) to the panel adjacent said aperture; and (b) securing the device to the base plate.
7. A unit having a device fitted according to claim 6 characterised by means (406,408,410) to release the base plate from the panel e.g. the floor of a vehicle, said means being inaccessible whilst the device is

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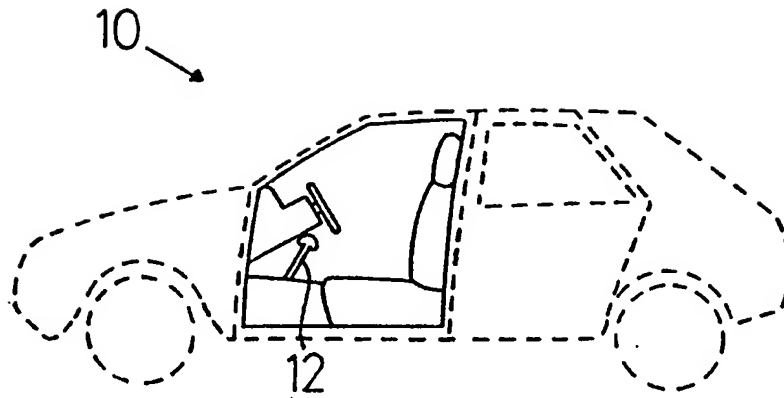


FIG 1

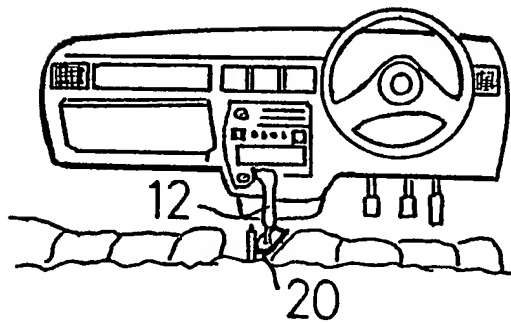


FIG 2

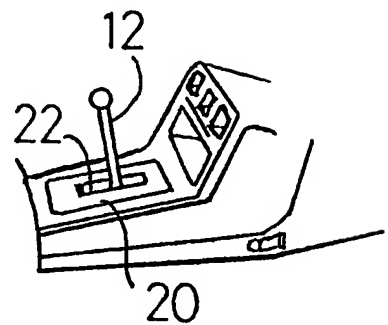


FIG 3

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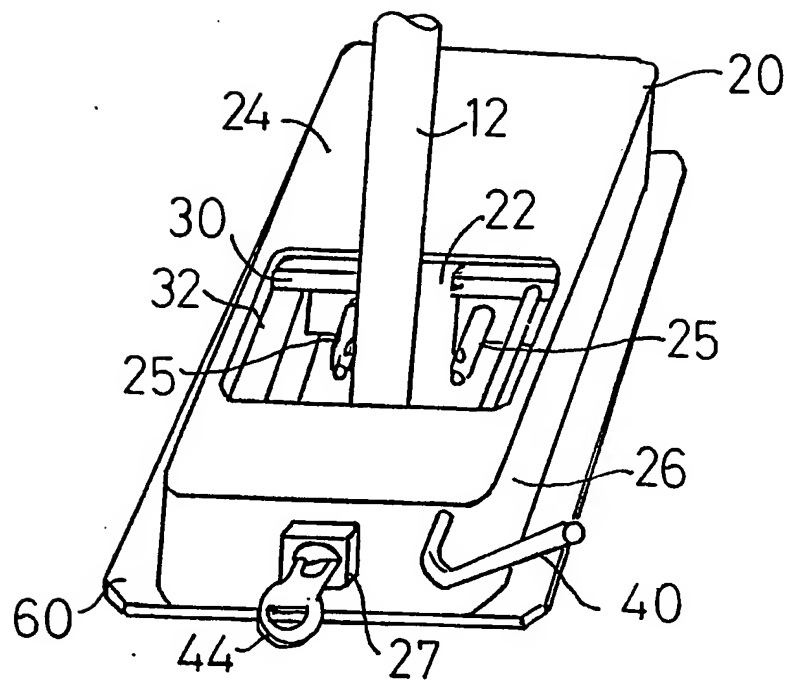


FIG 4

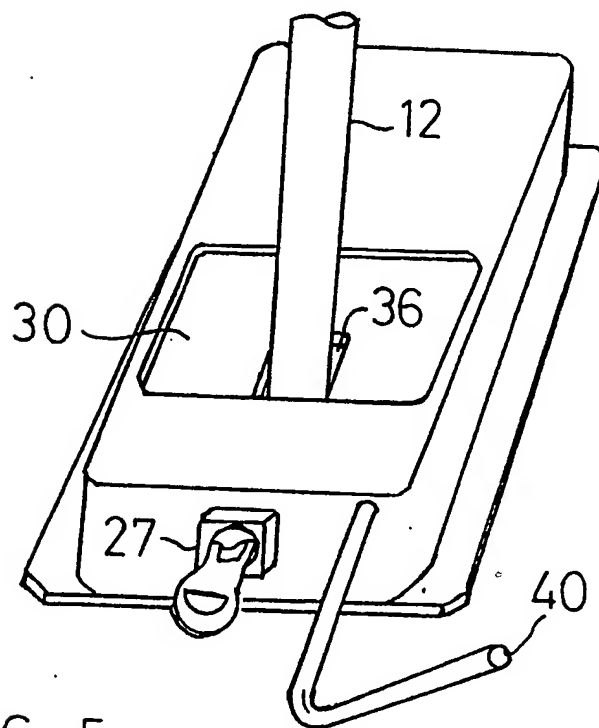


FIG 5

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FIG 6

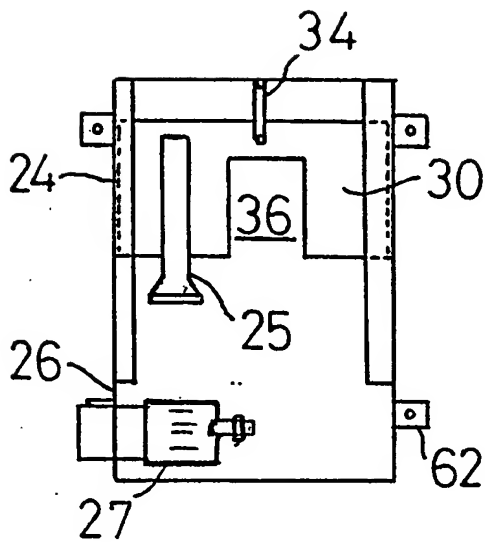
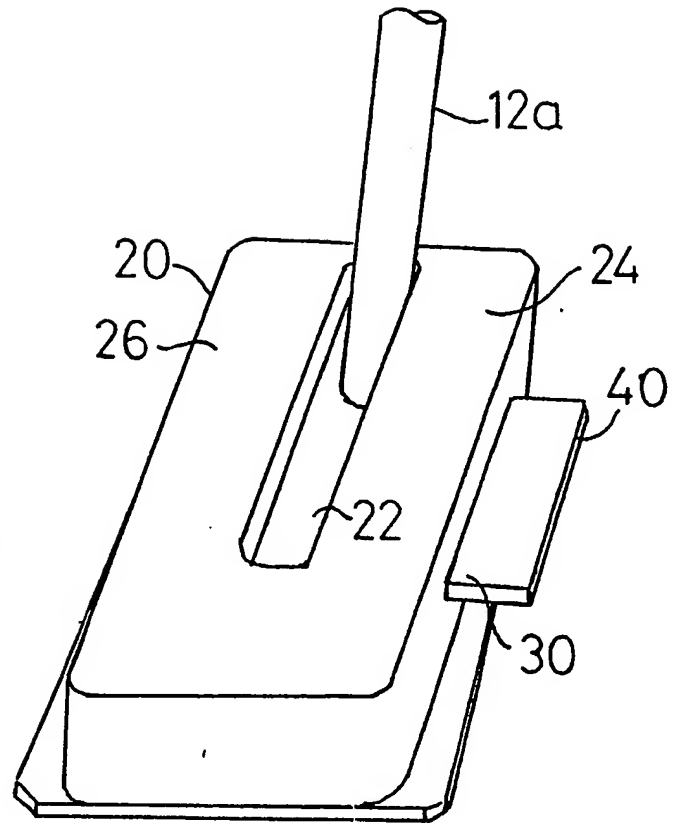


FIG 7

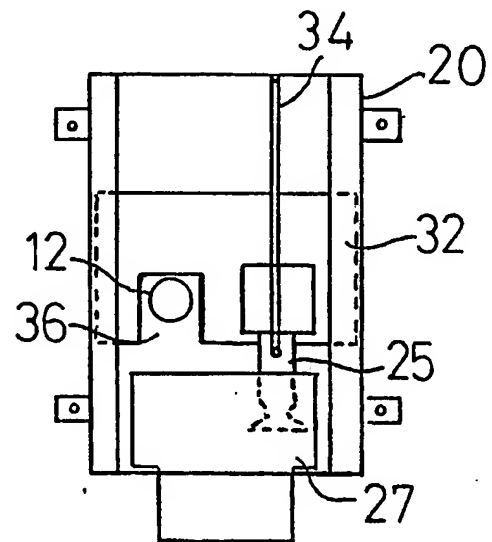


FIG 8



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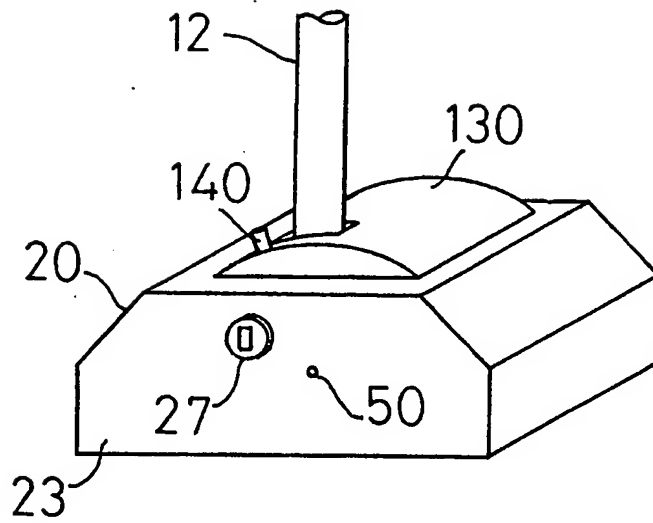


FIG 9

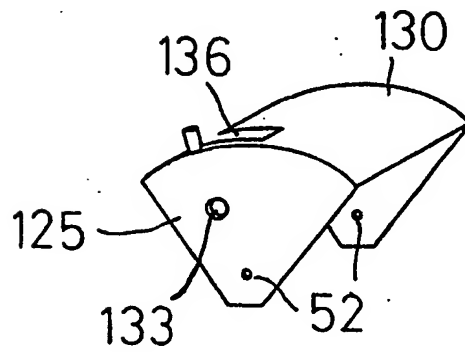


FIG 10

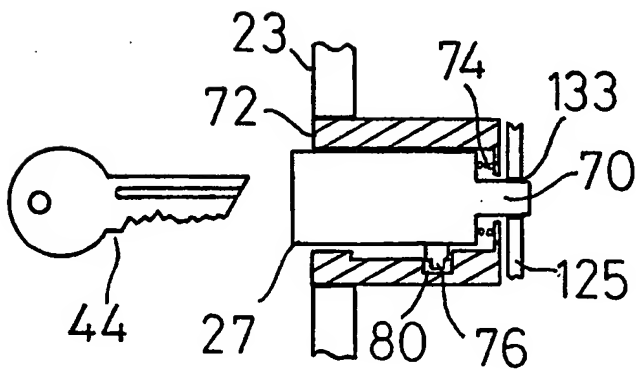
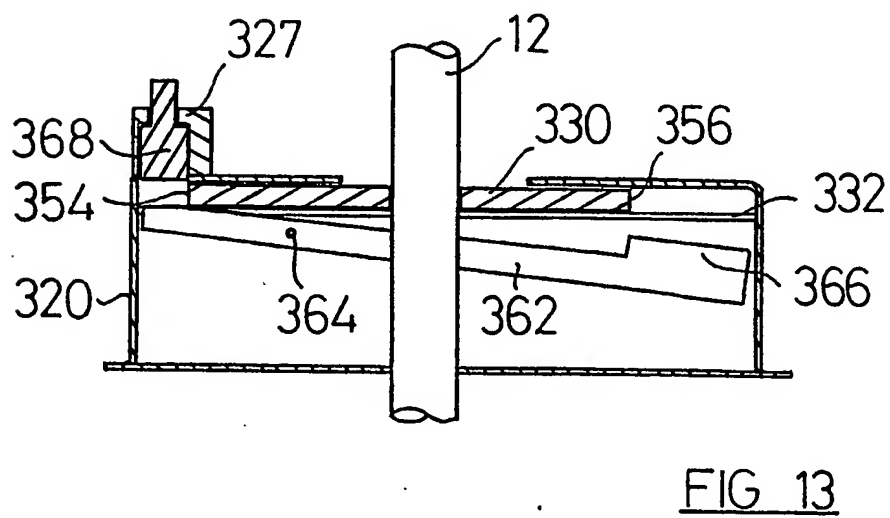
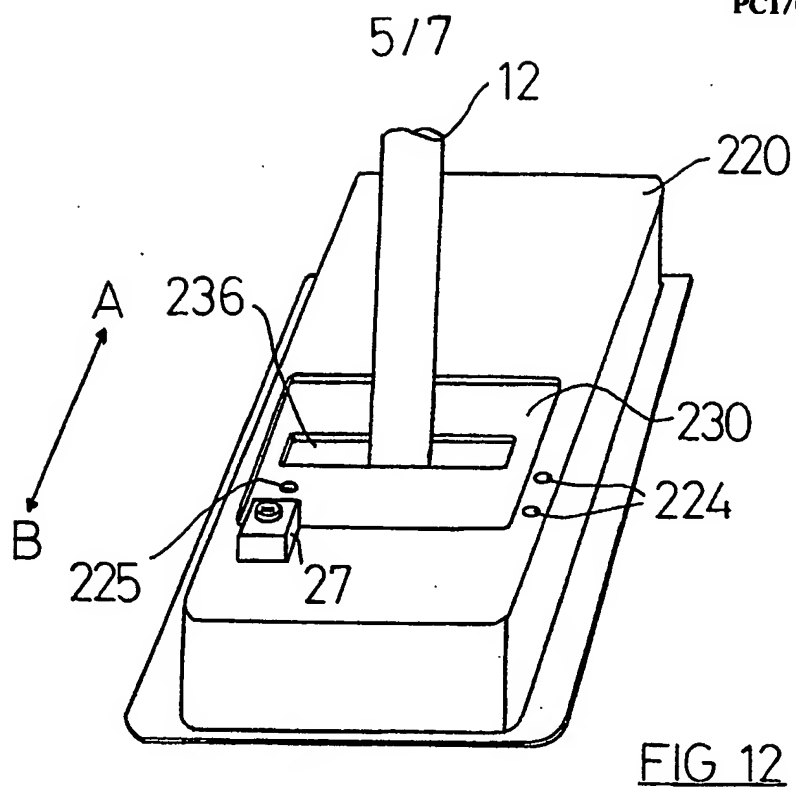


FIG 11



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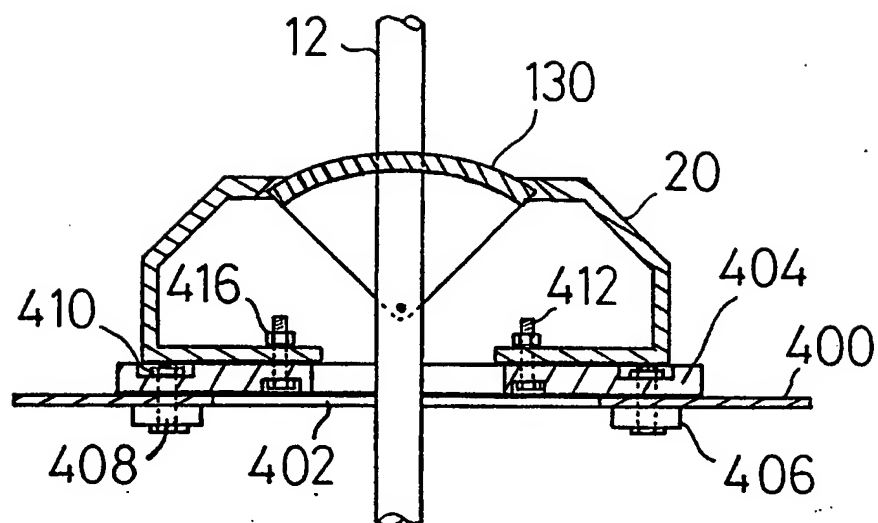


FIG 14

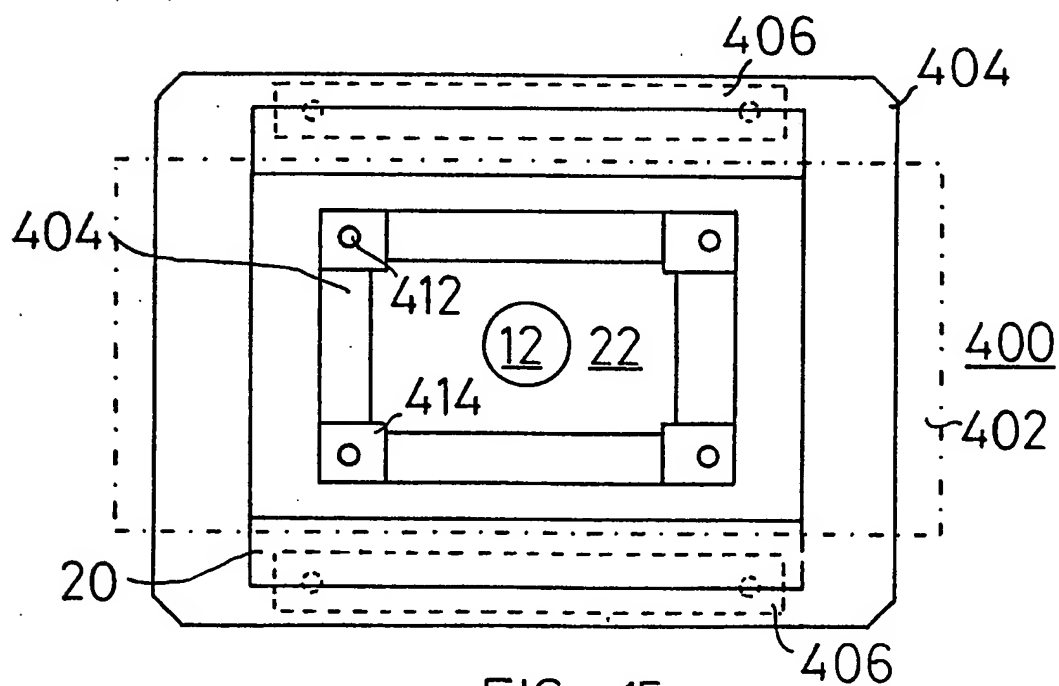


FIG 15

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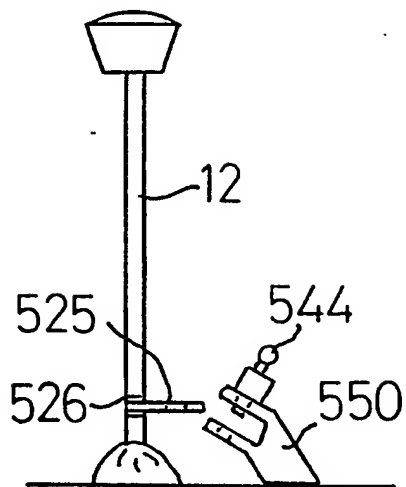


FIG 16

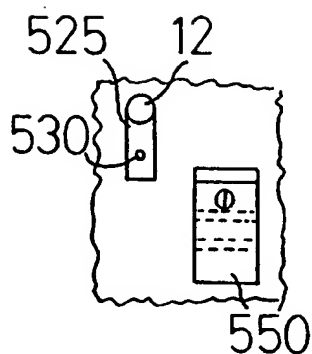


FIG 17

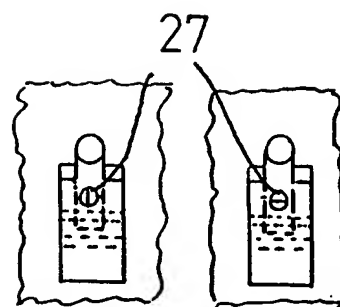


FIG 18

FIG 19

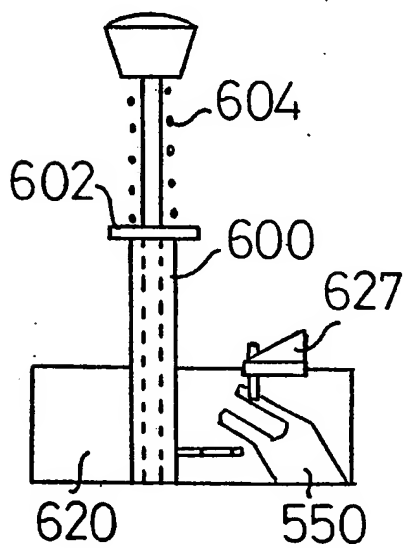


FIG 20

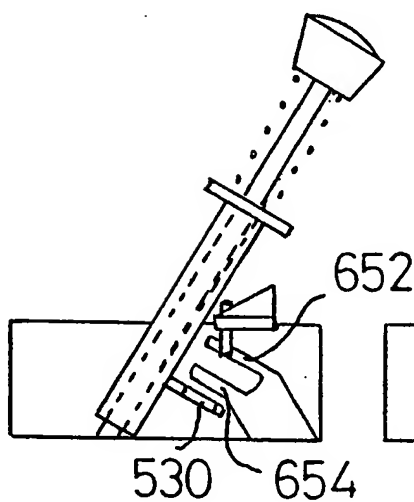


FIG 21

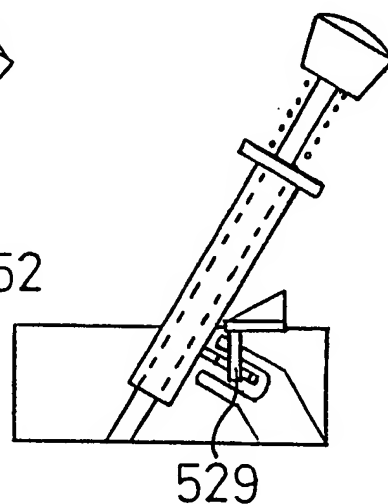


FIG 22

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 93/01779

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 5 B60R25/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 5 B60R

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	DE,A,31 34 614 (ARDIMENTO) 3 February 1983  see page 7, line 13 - page 9, line 22; figures 1-5 ---	1,2,4,8, 9 5,6
X	GB,A,2 152 454 (WILSON) 7 August 1985 see the whole document ---	1,2,8,9
X	DE,B,12 47 159 (STOLLE) 10 August 1967  see column 2, line 24 - column 3; figures ---	1,2,4, 6-10
X	DE,B,12 08 641 (KOLB) 5 January 1966  see column 2, line 44 - column 4; figures ---	1,2,4,6, 8-10
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Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

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"&amp;" document member of the same patent family

Date of the actual completion of the international search

11 November 1993

Date of mailing of the international search report

29. 11. 93

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BECKER, R

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 93/01779

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE,A,27 36 552 (BLANK) 22 February 1979 see page 4; figures 1-3 ---	1,4
X	FR,A,980 654 (LEMOTTE ET AL.) 16 May 1951 see the whole document ---	1,2,8,9
A	DE,C,37 05 317 (SCHWARZ) 28 July 1988 see the whole document ---	1,8
A	DE,U,90 15 290 (CHANG) 17 January 1991 see the whole document ---	1,8
A	DE,A,35 02 430 (FUREDER) 31 July 1986 see the whole document -----	1,8

## INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 93/01779

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE-A-3134614	03-02-83	NONE	
GB-A-2152454	07-08-85	NONE	
DE-B-1247159		NONE	
DE-B-1208641		NONE	
DE-A-2736552	22-02-79	NONE	
FR-A-980654		NONE	
DE-C-3705317	28-07-88	NONE	
DE-U-9015290	17-01-91	NONE	
DE-A-3502430	31-07-86	NONE	